

A NEW *DIPLOPERLA* FROM WEST VIRGINIA
(PLECOPTERA: PERLODIDAE)

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Abstract.—*Diploperla kanawholensis*, n. sp., is described from Braxton and Lewis Counties, West Virginia. The diagnostic features of the adult male and female, egg, and mature nymph are presented. Ecological notes, physical-chemical data, and other associated species of Perlodinae are also given.

While preparing a manual on the stoneflies of Virginia we studied also those from the surrounding states. We collected and reared a new species in the family Perlodidae from the Little Kanawha River in West Virginia.

The eastern Nearctic genus *Diploperla* Needham and Claassen has been reviewed by Stark and Gaufin (1974) and Kondratieff et al. (1981). The new species described here is presently included in the genus *Diploperla* because (1) the presence of well-defined lobes on both the seventh and eighth abdominal sterna of the adult male, and (2) the absence of a long setal fringe on the dorsum of the nymphal cerci. However, the male shares with the Nearctic genus *Cultus* an epiproct being nearly equal to or exceeding the lateral stylets in length. The egg is tortoise shaped as is typical for *Diploperla* and *Cultus*. Conclusive generic placement will have to await future studies on the phylogenetic relationships among *Diploperla*, *Cultus*, and related perlodine genera.

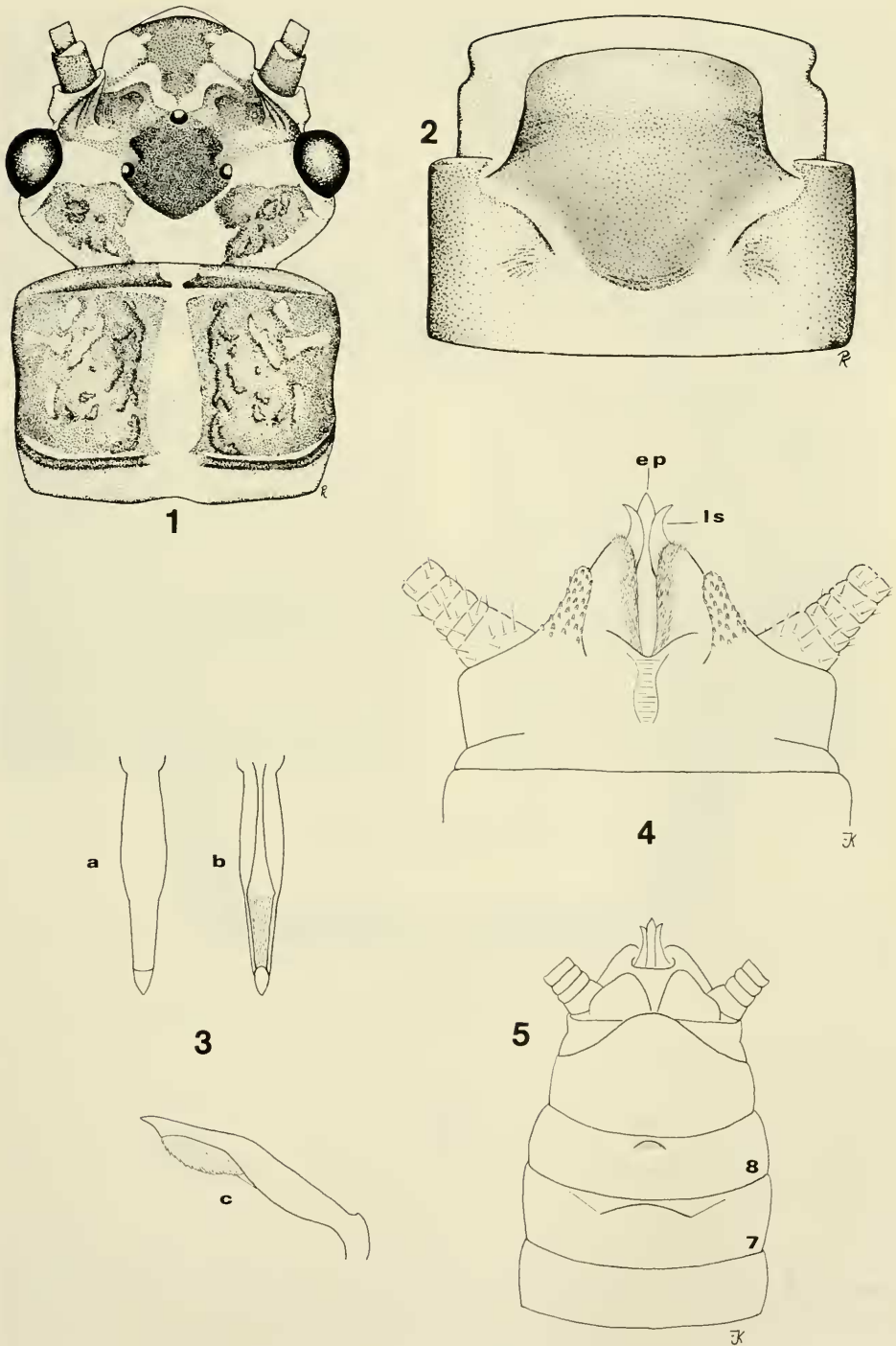
Diploperla kanawholensis Kirchner and Kondratieff NEW SPECIES

Figs. 1-10

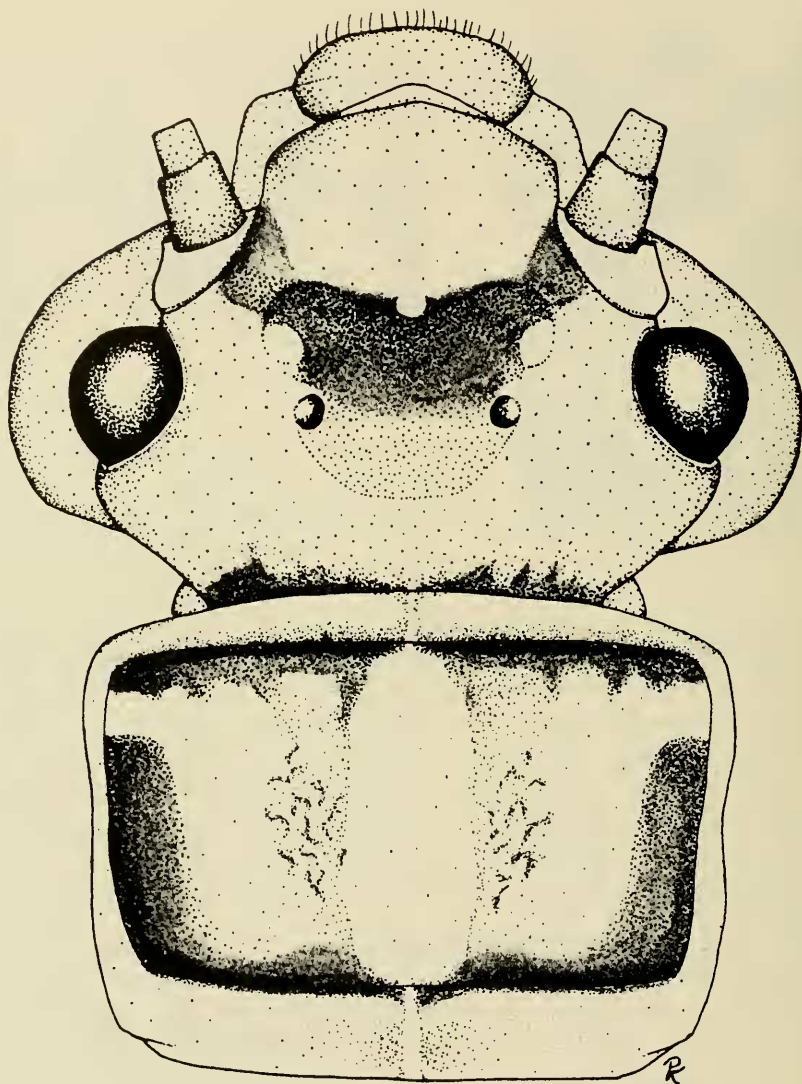
Adult.—Macropterous. Body length, male 15-16 mm; female 16-18 mm. Forewing length, male 14-15 mm; female 16-18 mm. General color yellow. Head yellow with dark brown markings in ocellar triangle, on clypeus, and behind compound eyes (Fig. 1). Antennae brown. Prothorax and sides of meso- and metapleura brown; prothorax with median yellow stripe. Wings hyaline, veins brown. Legs brown, distal apex of femora and tibiae yellow. Abdomen yellow, darker laterally. Cerci brown.

Male: Seventh and eighth abdominal sterna with well-defined lobes (Fig. 5).

¹ The views of the author do not purport to reflect the position of the Department of the Army or the Department of Defense.



Figs. 1-5. *Diploperla kanawholensis*. 1, Adult head and pronotum. 2, Female subgenital plate, ventral. 3, Male epiproct: a, dorsal, b, ventral, c, lateral. 4, Male terminalia, dorsal (ep = epiproct; ls = lateral stylets). 5, Male terminalia, ventral.

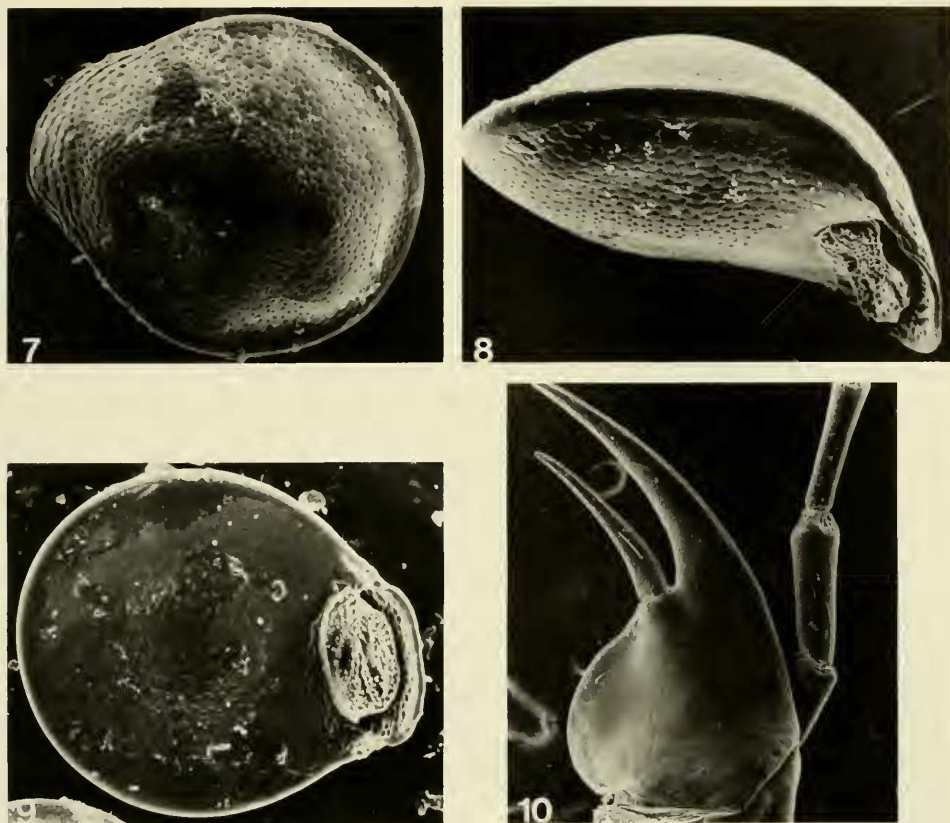


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Fig. 6. *Diploperla kanawholensis*. Nymphal head and pronotum.

Tenth tergum cleft behind with long, raised spinulose lobes. Lateral stylets shorter in length than epiproct, tips acute (Fig. 4). Epiproct sclerotized, prominent, long and slender in dorsal view (Fig. 3a); excavated ventrally enclosing an extrudable spinose membrane (Figs. 3b and 3c).

Female: Subgenital plate dark brown, produced over most or all of ninth sternum (Fig. 2), sides nearly parallel, apical margin broadly rounded to nearly truncate.



Figs. 7–10. *Diploperla kanawholensis*, scanning electron photomicrographs. 7, Egg, dorsal, 200 \times . 8, Egg, lateral, 260 \times . 9, Egg, ventral, 200 \times . 10, Mature nymph, left lacinia, 42 \times .

Egg.—General shape oval, cross section semicircular (Figs. 7–9). Chorion with visor-like extension covering collar (Figs. 7–9). Chorionic punctations in hexagonal pattern ventrally and dorsally, visor coarsely punctate (Figs. 7 and 9). Lateral margin of chorion slightly thickened (Fig. 8).

Nymph.—Length of mature nymph 14–18 mm. General body color yellow. Head with a transverse dark brown band enclosing ocellar triangle (Fig. 6). Base of lacinia rounded mesally with 1–4 small hairs (Fig. 10). Pronotum margined in dark brown. Femora with dark brown longitudinal streak. Anterior margin of abdominal terga dark brown. Cerci dark brown, without dorsal fringe of setae.

Material.—Holotype male, allotype, and paratype male: West Virginia, Braxton County, Little Kanawha River, at Falls Mill, U.S. 19, 4 May 1982, R. F. Kirchner and J. I. Fox. Paratypes: same locality as holotype 1 male, 2 females, 7 May 1982, R. F. Kirchner; 6 females, 8 May 1981, R. F. Kirchner; Braxton-Lewis County Line, Little Kanawha River, 1 mi. SW of Wildcat, 13 males, 7 females, 29 April 1983, R. F. Kirchner and B. C. Kondratieff.

The holotype, allotype, and paratypes will be deposited in the National Museum of Natural History, Washington, D.C. (Type number # 100888). Other paratypes will be deposited in the collections of the Illinois Natural History Survey, Cham-

paign; Virginia Polytechnic Institute and State University, Blacksburg; B. P. Stark, Mississippi College, Clinton; C. H. Nelson, University of Tennessee, Chattanooga; P. P. Harper, University of Montreal; and R. F. Kirchner.

Etymology.—The specific epithet, *kanawholensis*, is a New Latin adjective meaning "found in the Little Kanawha River." The name is formed from the New Latin noun, Kanawhole (= Little Kanawhola = Little Kanawha) and the suffix, ensis.

Diagnosis.—The adult male of *D. kanawholensis* is readily distinguished from all other species of *Diploperla* by the prominent epiproct and the long spinulose lobes of the tenth tergum. In *D. duplicata* (Banks), *D. robusta* Stark and Gaufin, and *D. morgani* Kondratieff and Voshell, the epiproct is greatly reduced and the spinulose lobes are short and rounded or blunt. The adult female of *D. kanawholensis* is similar to *D. morgani* in general appearance, but is distinguished by the shape of the subgenital plate (see Kondratieff and Voshell, 1982, Fig. 35). *Diploperla morgani* has the plate evenly tapered and the apical margin usually emarginate medially whereas in *D. kanawholensis*, the plate is nearly parallel sided and the apical margin broadly rounded or truncate.

The mature nymphs of *D. kanawholensis*, and *D. morgani* are very similar in morphology and color pattern and can not be separated satisfactorily at this time.

Remarks.—The Little Kanawha River at the type locality is a fourth order stream with a width of 34 m and a gradient of 2.2 m/km. The substrate consists of pebble, cobble, large boulders, and scattered beds of water-willow, *Justicia americana* (L.) Vahl. (Acanthaceae). The following physical-chemical data for the stream were provided by the Army Corps of Engineers from their water quality monitoring station at Falls Mill: 1–25°C; specific conductance, 3–49 $\mu\text{mho/cm}$; dissolved oxygen, 7–13 mg/l; pH, 5.6–7.4; alkalinity as CaCO_3 , 2–26 mg/l; and total hardness as CaCO_3 , 1–18 mg/l. Other Perlodinae associated with *D. kanawholensis* include *D. duplicata* (Banks), *Isogenoides hansonii* (Ricker), and *Helopicus subvarians* (Banks).

ACKNOWLEDGMENTS

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LITERATURE CITED

- Kondratieff, B. C., R. F. Kirchner, and J. R. Voshell, Jr. 1981. Nymphs of *Diploperla*. Ann. Entomol. Soc. Am. 74: 428–430.
- Kondratieff, B. C., and J. R. Voshell, Jr. 1982. The Perlodinae of Virginia, USA (Plecoptera: Perlodidae). Proc. Entomol. Soc. Wash. 84: 761–774.
- Stark, B. P. and A. R. Gaufin. 1974. The genus *Diploperla* (Plecoptera: Perlodidae). J. Kans. Entomol. Soc. 47: 433–436.